DB Name	Query	Hit Count	Set Name
USPT	blank$ and l11	5	L12
USPT	4399456	12	L11
USPT	stereo$ with line with blank$	19	L10
USPT	(blank$ with control$) and l8	44	L9
USPT	stereo$ and l7	84	L8
USPT	line$1 adj2 (blanker$ or blanking)	1402	L7
USPT	blank$ and l5	43	L6
USPT	348/56	171	L5
USPT	line with doubler and interpolat$ and line with blank$	17	L4
USPT	(stereo$ or three dimension$ or 3 d or 3-d or 3d) and l2	31	L3
USPT	(line blanking or line blanker$1) and odd and even	137	L2
USPT	alternat$ and 4399456.pn.	1	L1

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L6: Entry 1 of 4 File: USPT Feb 13, 2001

DOCUMENT-IDENTIFIER: US 6188451 B1
TITLE: Optical rotary device and manufacturing method thereof and image display device using thereof

BSPR:
Further, according to the above-arrangement, it is not required to combine two substrates having the polarization region as it has been required conventionally. Therefore, the optical rotatory device can be manufactured by a simpler method than the conventional method. Further, since the process for combining of two substrates is not required, the problem of positioning error during combining the substrates does not occur. Thus, in the case where an optical rotatory device manufactured by the described method are employed in a stereoscopic image display device, for example, a stereoscopic image display device having an excellent visibility in which no black line and blank occur can be realized.

BSPR:
With this arrangement, since each pixel of the display device correspond to the optical rotatory region and the non-optical rotatory region of the optical rotatory device, it is ensured that the outgoing light from the each pixel is incident on the optical rotatory region or the non-optical rotatory region. Therefore, in the case of providing a the stereoscopic image display device in which an optical rotatory device is provided in a display device, a stereoscopic image display device having an excellent visibility and high quality displaying in which no black line and blank having no image information can be realized. Furthermore, unlike a conventional image display device, an electric circuit etc. for applying a voltage to the pixels is not required, thereby reducing the size, the weight, and the cost of the device.

DEPR:
Further, according to the above-arrangement, it is not required to combine two substrates having the polarization region as it has been required conventionally. Therefore, the optical rotatory devices 6 and 6' can be manufactured by a simpler method than the conventional method. Further, since the process for combining of two substrates is not required, the problem of positioning error during combining the substrates does not occur. Thus, in the case where optical rotatory devices 6 and 6' manufactured by the described method are employed in a stereoscopic image display device, a stereoscopic image display device having an excellent visibility in which no black line and blank occur can be realized.

End of Result Set

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L12: Entry 5 of 5 File: USPT Aug 16, 1983

DOCUMENT-IDENTIFIER: US 4399456 A
TITLE: Three-dimensional television picture display system and picture pick-up device and picture display device suitable therefor

ABPL:
A three-dimensional television picture display system in which information intended for the right and left eye, respectively, of an observer is generated on a display screen (11, 20) in respective first and second images (V1, V2) which are shifted into the direction of line scan. In order to prevent eye strain due to conflicting depth information and any resultant headache, irritation and discomfort, the periodic line blanking of the second image (V2) intended for the left eye is shifted into the direction of line scan at picture generation on the display screen (11, 20) relative to the periodic line blanking of the first image (V1) intended for the right eye. The three-dimensionally shifted line blanking can be realized either electronically (6, 7; 22) or by providing on either side of the display screen (20) of the picture display device (19) strips (HB1, HB2) which transmit/do not transmit information.

BSPR:
The invention relates to a three-dimensional television picture display system comprising a picture pick-up device and a picture display device having a picture display screen and scanning means for performing, in scanning periods, and with blanking periods a periodic scanning operation of the screen at line and field frequency for generating on the screen a picture corresponding to the original scene recorded with the pick-up device, information which is intended for the right and for the left eye, respectively, of an observer being present in this picture in first and second images, respectively, the images being shifted in the direction of line scan, which, for an entire, image information-separated observation with two eyes results in a three-dimensional picture, and to a picture pick-up device and a picture display device suitable therefor.

BSPR:
The invention has for its object to eliminate a cause of conflicting depth information, resulting in positive criticism of a picture. A display device in accordance with the invention is therefore characterized in that when a picture is generated on the picture display screen, the periodic line blanking of the second image intended for the left eye is shifted in the direction of line scan relative to the periodic line blanking of the first image intended for the right eye.

BSPR:
The invention is based on the recognition that very disturbing, conflicting depth information in the picture particularly occurs at the left-hand and the right-hand side of the display screen, that is to say at the beginning and at the end of the line scan, and that it can be prevented by performing the line blanking in the shifted, three-dimensional manner. This accomplishes that only the right and left eye, respectively, of the observer sees information at the left-hand and right-hand side, respectively, of the display screen and consequently is not offered conflicting depth information as is the case when both eyes are offered information from either side of the screen. In practice, the three-dimensionally shifted line blanking results in a considerable improvement of the picture quality.

BSPR:
A simple construction of a system comprising a picture pick-up device comprising

a first and a second television camera which, on recording, represent the right and the left eye, respectively, also comprising a signal generator for producing synchronizing and blanking signals, in which system the shifted line blanking is accomplished in an electronic, simple manner, is characterized in that the picture pick-up device comprises a first and a second line blanking circuit each having a control input for receiving a line blanking signal and a signal input for connection to an output of the first and of the second television camera, respectively, said camera outputs being intended to carry signals representing the scene, a signal generator output for carrying a line blanking signal being connected to the control input of the first line blanking circuit and, via a delay device, to the control input of the second line blanking circuit.

BSPR:
A further simple embodiment is characterized in that outputs of the first and second line blanking circuits are connected to inputs of a change-over device which has a control input which is connected to an output of the signal generator for carrying a field change-over signal, an output of the change-over device being coupled to an output terminal of the picture pick-up device.

BSPR:
An embodiment of a system comprising a pick-up device having a first and a second television camera which on recording represent the right and the left eye, respectively, and a signal generator producing synchronizing and blanking signals, in which system the shifted line blanking may be optionally realized in an electronic or a non-electronic manner, is characterized in that outputs of the first and the second television cameras, which are intended to carry the signals representing the scene, are connected to inputs of a first change-over device having a control input which is connected to an output of the generator for carrying a field-change-over signal, an output of the first change-over device being coupled to an output terminal of the picture pick-up device.

BSPR:
A further simple embodiment of the system in which the line blanking is performed electronically is characterized in that the output terminal of the picture pick-up device and an output of a first picture storage device, which has an input for connection to the output terminal of the picture pick-up device, respectively, is connected to a signal input of a line blanking circuit which has a signal output for connection to an input of the picture display device and of a second picture storage device, respectively, and a control signal input for receiving a line blanking signal, this control input being connected to an output of a second change-over device having a first and a second signal input which are connected directly and via a delay device, respectively, to an output of the signal generator for carrying a line blanking signal, said second change-over device having a control input which is connected to an output of the signal generator for carrying a field change-over signal.

BSPR:
A further simple embodiment of the system in which the shifted line blanking is performed non-electronically, is characterized in that the picture display device in the system has an input intended to be connected to the output terminal of the picture pick-up device and to an output of a picture storage device having an input for connection to the output terminal of the picture pick-up device, respectively, a vertical strip being provided transversely of the direction of line scan on either side of the display screen of the picture display device, the strip, present on the display screen at the beginning and at the end of the line scan, respectively, not transmitting the information locally generated in the second and first image, respectively, intended for the left and right eye, respectively, of the observer.

BSPR:
A further picture display device in which the observer can optionally adjust the extent to which the line blanking is shifted three-dimensionally, is characterized in that the vertical strips are movable in the horizontal direction at the edge of the display screen.

BSPR:
A picture display device in the form of a projection picture display device which is adapted in a simple manner for performing the three-dimensionally shifted line blanking, is characterized in that the device comprises a projection picture tube

having a display screen on which on either side a strip is provided which is positioned transversely of the direction of line scan and is removable from the screen, the strip being present at the beginning and end, respectively, of the line scan, not passing information intended for the left and the right eye, respectively, of the observer.

DEPR:
Referring to FIG. 1, reference numeral 1 denotes a scene which is recorded from two different angles by two television cameras 2 and 3. The camera 2 (CR) and 3 (CL), respectively, correspond to the right and left eyes, respectively, of a viewer. Under the control of a signal generator 4, which produces, for example, a field synchronizing and field blanking signal SV(B), a line synchronizing signal SH and a line blanking signal SHB, the cameras 2 and 3 supply picture signals SR and SL, respectively, during a line-by-line and field-by-field processing of the scene information in a manner which is customary for television. In addition, the signal generator 4 produces a line blanking signal SHB1 and a field change-over signal SV1, SV2.

DEPR:
In FIG. 2 some signal variations are plotted as a function of the time t. In FIG. 2a a field synchronizing signal SV is plotted over approximately two field periods TV, TV1 and TV2 representing two different field periods which are each associated with a first and a second image V1 and V2, which together form an interlaced picture on display. To enable a distinction between the first and second images V1 and V2 of a picture, the signal SV1 and SV2 are given which vary, for example, as shown in FIG. 2a. In FIGS. 2b and 2c, respectively, signals are plotted over approximately a line period TH which occurs in the respective first and second field periods TV1 and TV2, respectively. In FIGS. 2b and 2c the line synchronizing signal SH and the line blanking signal SHB are plotted as identical signals. The signals SH and SHB are substantially of a form such as they are fixed in television standards. For, for example, the CCIR 625-line standard, it holds, at a line period TH=64 .mu.s, that a line blanking period THB has a duration of 11.8 to 12.3 .mu.s, a pulse in the line synchronizing signal SH has a duration of 4.6 to 4.8 .mu.s, a duration of 1.3 to 1.8 .mu.s holding for the what is commonly referred to as the front porch, that is to say the duration between the negative-going pulse edges in the signals SHB and SH. From this it follows that the what is commonly referred to as the back-porch, the remaining duration in the line blanking period THB, has a duration of 5.2 to 6.4 .mu.s.

DEPR:
The line blanking signal SHB1 is plotted in FIG. 2b, the descending pulse leading edge occurring before it is produced in the signal SHB and the ascending pulse leading edges in both signals SHB and SHB1 being produced simultaneously. In FIG. 1 it is shown that the signal SHB1 is applied to a delay device 5 (T) which produces a line blanking signal SHB2. FIG. 2c shows the line blanking signal SHB2 resulting from the delay, the descending pulse leading edges in the signals SHB and SHB2 being produced simultaneously and the ascending pulse trailing edge in the signal SHB2 being produced at a later moment than that in the signal SHB. Instead of forming the signal SHB2 by delaying the signal SHB1, thoughts might alternatively go towards a direct generation from the signal SHB.

DEPR:
In FIG. 1 the signal SHB1 also applied to a control input of a line blanking circuit 6 which includes a signal input to which the signal SR, supplied by the camera 2, is applied. The signal SHB2 is applied to a control input of a line blanking circuit 7 which has a signal input to which the signal SL, supplied by the camera 3, is applied. The outputs of the circuit 6 and 7, respectively, are connected to inputs of a change-over device 8. A control input of the change-over device 8 is connected to the generator 4 output on which the field change-over signal SV1, SV2 is present. As a result thereof, an output of the change-over device 8 is connected in the first field period TV1 (FIG. 2a) to the output of the camera 2 and in the second field period TV2 to the output of the camera 3. At the change-over device 8 the passing-on of the information associated with a first and a second image V1 and V2, respectively, is denoted by the same reference at contacts connected to the respective inputs.

DEPR:
The output of the change-over device 8 is connected to an input of an adder circuit 9 to a further input of which the line synchronizing signal SH produced

by the signal generator 4 is applied. The output of the adder circuit 9 is connected to an output terminal 10 of a picture pick-up device (2-10) formed thus. The output terminal 10 carries a signal SRB1, SLB2, the signal SRB1 for the duration of one line period in the first field period TV1 being shown in FIG. 2b, and the signal SLB2 for the duration of one line period in the second field period TV2 being shown in FIG. 2c. The signal SRB1 of FIG. 2b is represented as a video signal in which the line blanking has been increased by a period of time THB1 at the end of the line scan. For the signal SLB2 of FIG. 2c, it follows that in the video signal, the line blanking is increased by a period of time THB2 at the beginning of the line scan. For these periods of time it holds that THB1=THB2=T, T being the time delay of the delay device 5.

DEPR:
On displaying the signal SRB1, SLB2 present on the output terminal 10, on a display screen 11 of a picture display device 12 by means of the scanning means 13 provided therein, the result is that at the left-hand side of the screen 12, where the line scan starts, scene information is present, produced by the signal SRB1, but that the scene information in the signal SLB2 is blanked. For the right-hand side of the screen 11 it follows that scene information is indeed displayed there from the signal SLB2, but not from the signal SRB1. Starting from the general rule for three-dimensional display that scene information intended for the left and the right eye, respectively, of a viewer is observed by that eye only this results in that, irrespective of the construction of the display device 12, the right eye is and the left eye is not supplied with scene information from the left-hand side of the screen 11, while this situation is reversed for the right-hand side of the screen 11. This corresponds to a direct observation of the scene 1 by the eyes of an observer via a window. Namely, the vertical posts of the window cover a right-hand and left-hand portion, respectively, of the scene for the right and left eye, respectively. Without the above-described shifted line blanking the right and left eye would receive scene information from as far as the side edges of the screen 11, which gives the observer a conflicting depth information, which results in eye strain and headache.

DEPR:
As regards the periods of time mentioned in the foregoing, it holds that in practice, depending on the content of the scene and the viewing distance, a period of time THB1=THB2 equal to 1 up to approximately 3 .mu.s is very satisfactory. The overall line blanking period is then increased by 2 to 6 .mu.s.

DEPR:
If the signal SR1, SL2, which is applied in combination with the line synchronizing signal SH, is displayed on the display screen 20 without further measures, it would result in the above-described manner with conflicting depth information on either side of the screen 20. In accordance with the invention, vertical strips HB1 and HB2 are applied at either side on the display screen 20, which, when provided on the right and on the left, respectively, do not pass information generated on the screen 20 intended for the right and left-eye, respectively, of the observer of the screen 20. Instead of employing an electronic adaptation of the line blanking periods THB to the durations THB1 and THB2, described for the display device 12, the display device 19 employs a non-electronic adaptation. This adaptation may be used in a very simple manner in three-dimensional display systems based on the use of polarization and on the use of lenticular strips. Herein the strips HB1 and HB2 are strips of properly polarized material, or they consist of a plurality of strips which, by way of cover, are provided in the proper location at the lenticular strips. The width of the strips HB1 and HB2 is primarily dependent on the width of the display screen 20. When the diagonal across the display screen 20 is equal to 66 cm, a width of, for example, 3 cm may be selected for the strips HB1 and HB2, 1 cm width approximately corresponding to 1 .mu.s during line scanning.

DEPR:
Via the dashed connection shown in FIG. 1, the output terminal 17 may be directed connected to a signal input of a line blanking circuit 22. It is further shown that the signal input of the line blanking circuit 22 is connected to the output of the picture storage device 18, whose input is connected to the terminal 17. In the line blanking circuit 22, the signal SR1, SL2 is provided with the shifted line blanking, either immediately after generation or at a later moment after storage. When signal processing is effected from the picture storage device 18,

said device, applies a start-synchronizing signal to the signal generator 4. A control input of the circuit 22 is connected to an output of a change-over device 23, which has two inputs, connected to contacts V1 and V2, for receiving the respective line blanking signals SHB1 and SHB2, which are produced directly and via a delay device 24, respectively, by the signal generator 4. The output of the line blanking circuit 22 is connected to an input of an adder circuit 25 to a further input of which the line synchronizing signal SH is applied. In response thereto the output of the adder circuit 25 carries the signal SRB1, SLB2 which is applied to the display device 12 and/or, via the dashed-line connection, to the picture storage device 14.

DEPR:
In the event that a pseudo-three-dimensional system is used in which the information in the images intended for the left and the right eye is identical and has only been shifted in the horizontal direction, the shifted line blanking may also be employed, which results in an improvement of the depth sensation.

CLPR:
1. A three-dimensional television picture display system comprising a picture pick-up device and a picture display device having a picture display screen and scanning means for performing, in scanning periods and with blanking periods, a periodic scanning operation of the screen at line and field frequency for generating on the screen a picture corresponding to the original scene recorded with the pick-up device, information which is intended for the right and for the left-eye, respectively, of an observer being present in this picture in first and second images, respectively, the images being shifted in the direction of line scan, which, for an entire, image information-separated observation with two eyes, results in a three-dimensional picture, characterized in that said system further comprises means for shifting the periodic line blanking of the second image relative to the periodic line blanking of the first image in the direction of line scan.

CLPR:
2. A system as claimed in claim 1, wherein said picture pick-up device comprises a first and a second television camera which, on recording, represent the right and left eye, respectively, and a signal generator for producing line and field synchronizing and blanking signals, characterized in that said shifting means is incorporated in the picture pick-up device, and said shifting means comprises a first and a second line blanking circuit, each having a control input for receiving a line blanking signal and a signal input for connection to an output of the first and the second television camera, respectively, said camera outputs carrying signals representing the scene, a line blanking signal output of said signal generator being connected to the control input of the first line blanking circuit and, via a delay device, to the control input of the second line blanking circuit, the outputs of the said first and second line blanking circuits are connected to respective inputs of a change-over device, a control input thereof being connected to a field change-over output of the signal generator, and an output of said change-over device being coupled to an output terminal of the picture pick-up device.

CLPR:
3. A system as claimed in claim 1, wherein the picture pick-up device comprises a first and a second television camera which, on recording, represent the right and left eye, respectively, and a signal generator for producing line and field synchronizing and blanking signals, characterized in that outputs of the first and the second television camera carrying signals representing the scene are connected to inputs of a first change-over device which has a control input which is connected to an output of the generator for carrying a field-change-over signal, an output of said first change-over device being coupled to a signal input of a line blanking circuit which has a signal output for connection to an input of the picture display device, and a control signal input for receiving a line blanking signal, this control input being connected to an output of a second change-over device which has a first and a second signal input which are connected directly and via a delay device, respectively, to an output of the signal generator for carrying a line blanking signal, said second change-over device having a control input which is connected to an output of the signal generator for carrying a field change-over signal.

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